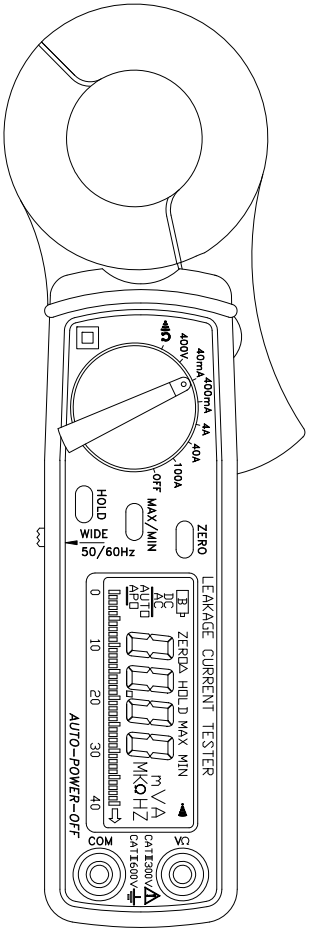
AC LEAKAGE CURRENT TESTER

Model CM-03

USER'S MANUAL



PROVA INSTRUMENTS INC.

EN 61010-2-032
CAT II 600V
CAT III 300V
Pollution Degree 2

Definition of Symbols:

Caution: Refer to Accompanying Documents

Caution: Risk of Electric Shock

Double Insulation

Overvoltage Category I (CAT I):
Equipment for connection to circuits in which measures are taken to limit the transient overvoltages to an appropriate low level.
Overvoltage Category II (CAT II):
Energy-consuming equipment to be supplied from the fixed installation.
Overvoltage Category III (CAT III):
Equipment in fixed installations.

WARNING: If the clamp meter is used in a manner not specified by the manufacturer, the protection provided by the clamp meter may be impaired.

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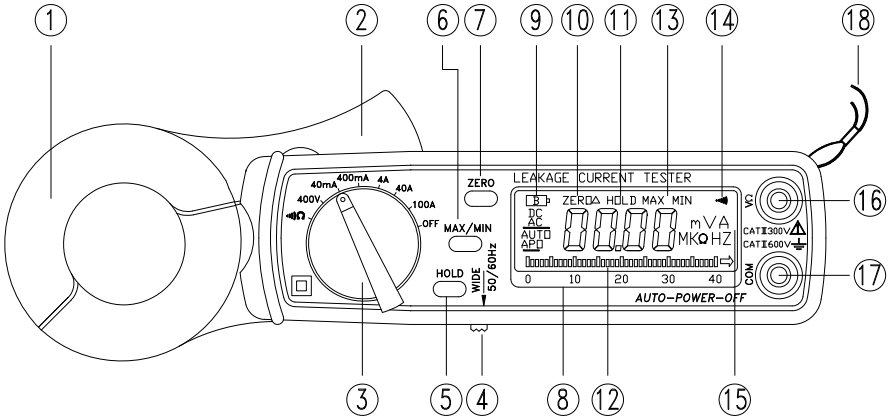
1. Features

1. Accurate AC digital clamp meter for leakage current measurement.
2. 10μA high resolution on 40mA range.
3. Shield transformer jaws to minimize the effect of external stray magnetic field.
4. Large jaw with 30 mm diameter.
5. Five Ranges (40mA, 400mA, 4A, 40A, 60A) for all application.
6. A filter circuit is designed to eliminate the effect of high frequency noise and harmonics for AC current measurement.
7. Large 3 3/4 digits LCD
8. Fast bargraph display (30 times/sec.) for transient observation.
9. Continuity and frequency measurements.
10. Max/Min, Data Hold functions, and Relative Measurement
11. 600V overload protection for ohm measurement.
12. Easy single rotary switch for any function selection.

2. Panel Description



1.Transformer Jaw

This is used to pick up current signal. To measure DC/AC current, conductor must be enclosed by the jaw.

2.Transformer Trigger

This is used to open the jaw.

3.Function Selector Switch

This is used to select the function user desired, such as ACV, ACA, Ohm and Continuity.

4.Frequency Selection Switch

At 50/60Hz position, only the low frequency signal is measured. At Wide position, signal from 40 - 1KHz is measured.

5.Data Hold Button

Once this button is pushed, reading shall be held on the LCD. Press again to release it. This button is not available in continuity function.

6.Max/Min Hold Button

This button is used to enable the maximum or minimum value to be displayed and updated during measurement. Press once, minimum value shall be displayed and updated. Press again, maximum value shall be displayed and updated. The Zero/Relative function will be disabled if Max/Min function is enabled. This button is not available in continuity function.

7.Zero/Relative Button

Once this button is pressed, the current reading shall be set to zero and be used as a zero reference value for all other subsequent measurement. This function will be disabled when MAX/MIN function is enabled. This button is not available in continuity function.

8.LCD

This is a 3 3/4 digit Liquid Crystal Display with maximum indication of 3999. Function symbols, units, bargraph, sign, decimal points, low battery symbols, max/min symbols, and zero symbol are included.

9.Low Battery Symbol

When this symbol appears, it means the battery voltage drops below the minimum required voltage. Refer to Section V for battery replacement.

10.Zero/Relative Symbol

When this symbol appears, it means a reference value has been subtracted from the actual reading. The reading shown is a offseted value. Press and hold the zero button for 2 seconds to disable this function.

11.Data Hold Symbol

Once the hold button is pressed, this symbol appears on LCD.

12.Bargraph

Bargraph has forty segments. It displays segments proportional to the actual reading. Each segment represent one count.

13.Max/Min Hold Symbol

Once the max/min button is pressed, either MAX or MIN shall be displayed on LCD

14.Continuity Symbol

If ohm and continuity function is selected, this symbol shall appears on LCD.

15.Units Symbols

Once a function is selected, corresponding unit (V, Ω, A, or Hz) shall be displayed on LCD.

16.VΩ Input Terminal

This terminal is used as input for voltage, or ohm/continuity measurements.

17.COM Terminal

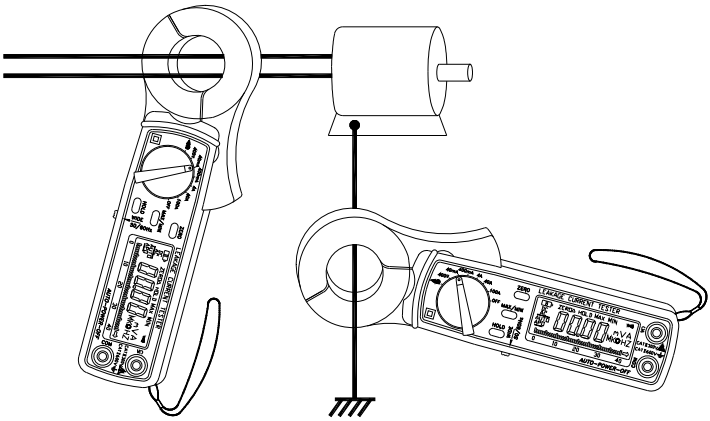
This terminal is used as common reference input.

18.Hand Strap

Put your hand through the hole of hand strap to avoid accidental drop of the clamp meter.

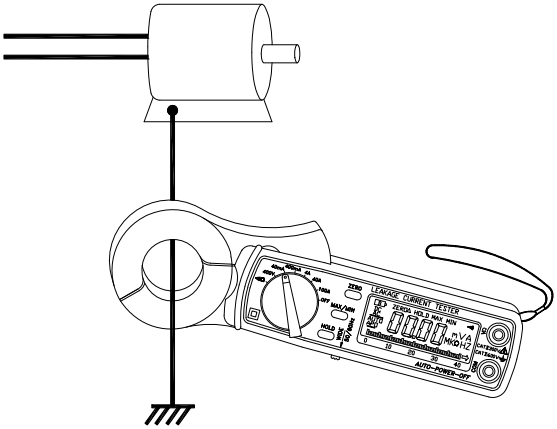
3. Operation Instructions

3.1. AC Leakage Current Measurement



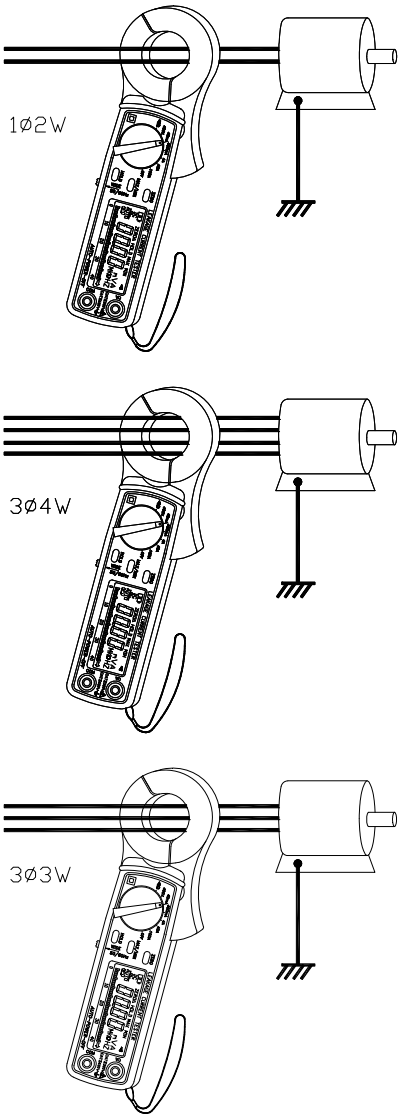
WARNING: Make sure that all the test leads are disconnected from the meter's terminals for current measurement.

3.1.1. Leakage Current Flowing into Ground Conductor



a. Set the rotary switch at desired range.
b. Press the trigger to open the jaw and fully enclose the wire goes to the ground. Make sure the two half jaws are properly closed.
c. Read the measured value from the LCD display.

3.1.2. Out of Balance Leakage Current



a. Set the rotary switch at desired range

b.Press the trigger to open the jaw and fully enclose all two wires(single phase, two wires), three wires(three phases, three wires), or four wires(three phases, four wires). Make sure the two half jaws are properly closed.

c. Read the measured value from the LCD display.

3.1.3. Using the 50/60 and Wide Selector

50/60 Position

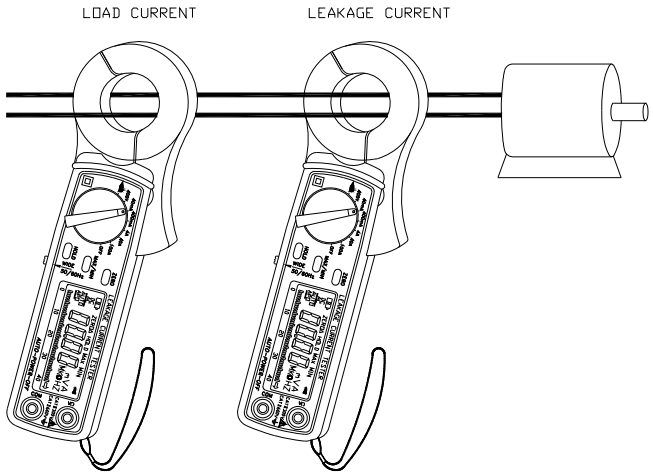
This clamp meter has very good frequency response due to the electric property of the transformer jaws used. Therefore, the measurement result contains not only the fundamental frequency of 50/60Hz but also the high frequencies and harmonics superimposed on the fundamental frequency. To eliminate the effect of high frequency noise, a low pass filter is designed to filter out high frequency signal. To enable the filter, set the switch at the 50/60 position. The filter's cut-off frequency is set at 100Hz with an attenuation characteristic of approx. 24dB/octave.

Wide Position

If the circuit under test is originated from a high frequency generating device such as inverter, switching regulators, etc., then the switch should be set at wide position to measure the signal which contains the frequency from 40Hz - 1KHz.

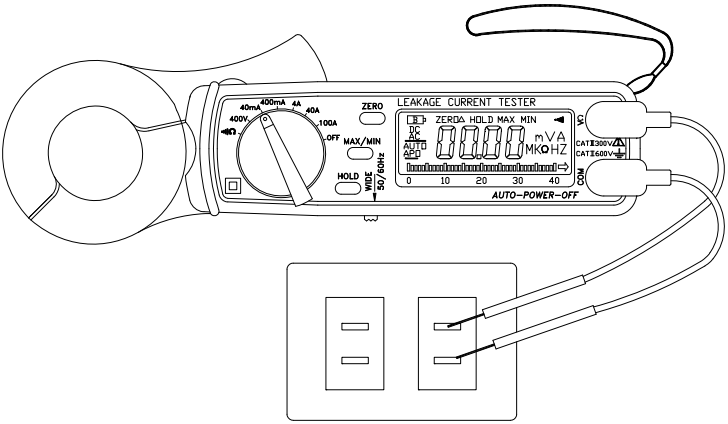
To make sure the presence of high frequency signal, set the switch at 50/60 and wide position to see the difference. If the reading is very different, it is certain that the high frequency signals or harmonics present.

3.2. AC Load Current Measurement



a. Set the rotary switch at desired range.
b. Press the trigger to open the jaw and fully enclose **only one wire**. No air gap is allowed between the two half jaws.
c. Read the measured value from the LCD display.

3.3. AC Voltage Measurements



WARNING: Maximum input for DC V is 600, and for AC V is 600. Do not attempt to take any voltage measurement that exceeds the limits. Exceeding the limits could cause electrical shock and damage to the clamp meter.

a. Set the rotary switch at 400V
b. Insert the test leads into the input jack.
c. Connect the test prods of the test leads in PARALLEL to the circuit to be measured.
d. Read the measured value from the LCD display.

WARNING: Before taking any in-circuit resistance measurement, remove power from the circuit being tested and discharge all the capacitors.

3.4. Resistance and Continuity Measurement

3.4.1.Set the rotary switch at Ω

3.4.2.Insert the test leads into the input jack.

3.4.3.Connect the test prods of the test leads to the two ends of the resistor or circuit to be measured.

3.4.4.Read the measured value from the LCD display.

3.4.5.If the resistance is lower than 40 Ω, a beeping sound shall be heard.

3.5. Relative Reading Measurements

The zero button also can be used to make a relative measurement. Once the button is pushed, the current reading is set to zero and a zero symbol shall be displayed on LCD. All the subsequent measurement shall be displayed as a relative value with respect to the value being zeroed. Press the zero button for 2 seconds to return to normal mode.

NOTE: The ZERO button is disabled if ohm and continuity function is selected.

3.6. Holding the LCD Reading

Press the HOLD button, then the reading shall be hold and kept on LCD.

NOTE: The HOLD button is disabled if ohm and continuity function is selected.

3.7. Finding the MAX/MIN Value

Press the MAX/MIN button to enable the maximum and minimum values to be recorded and updated during measurement. Push the button once, the maximum value shall be displayed and updated. The LCD display toggles between the MAX and MIN values. To exit MAX/MIN function, press and hold the MAX/MIN button for more than 2 seconds.

NOTE: The MAX/MIN button is disabled if ohm and continuity function is selected.

3.8. Auto-Power-Off

The meter will turn itself off 15 minutes after power-on (A symbol of APO is displayed in LCD). To turn it on again, user can either press any button or turn the rotary switch. Also pressing any button or turning the rotary switch will reset the 15 minute timer.

To disable the Auto-Power-Off function, hold the HOLD button while turning on power.

4. Specifications(23◦C±5◦C)

AC Current:

		Accuracy		Remarks
Range	Resolution	50/60 Hz	Wide(40 - 1KHz)	
40mA	10μA	±1.0%±3dgts	±2.0%±5dgts	
400mA	100μA	±1.0%±3dgts	±2.0%±5dgts	
4A	1mA	±1.0%±3dgts	±2.0%±5dgts	
40A	10mA	±1.0%±3dgts	±2.0%±5dgts	
60A(0-50A)	100mA	±1.5%±3dgts	±3.0%±5dgts	
60A(50 - 60A)[1]	100mA	±3.0%±5dgts	±3.5%±5dgts	

[1]Though the meter can display up to 400A, it is not calibrated beyond 60A

AC Voltage:(Input Impedance: 10MΩ)

		Accuracy		Overload Protection
Range	Resolution	50/60 Hz	40 - 1KHz	
400V	0.1V	±1.5%±2dgts	±2.0%±4dgts	AC 800V

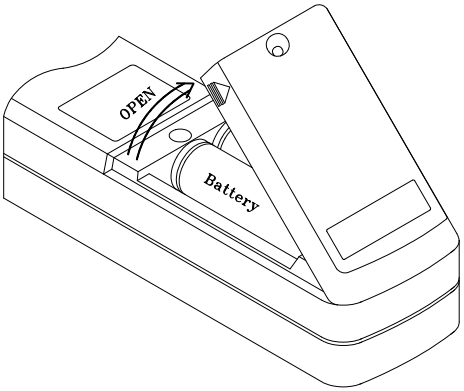
Resistance (Ω) and Continuity:(open voltage 0.4V)

Range	Resolution	Accuracy	Beeping	OL Protection
40-400Ω	0.1Ω	±1.0%±2dgts	< 38.0 Ω	AC 600V

Indoor Use
Conductor Size: 30mm max. (approx.)
Battery Type: two 1.5V SUM-3
Display: 3 3/4 LCD with 40 seg. bargraph
Range Selection: manual
Overload Indication: OL
Power Consumption: 15 mA (approx.)
Low battery Indication:

Sampling Time:	3 times/sec. (display)
	30 times/sec. (bargraph)
Operating Temperature:	-10°C to 50°C
Operating Humidity:	less than 85% relative
Storage Temperature:	-20°C to 60°C
Storage Humidity:	less than 75% relative
Altitude:	up to 2000M
Dimension:	210mm (L) x 62.0mm (W) x 35.6mm (H)
	8.3" (L) x 2.4" (W) x 1.4" (H)
Weight:	200g (battery included)
Accessories:	Carrying bag x 1
	Users manual x 1
	1.5V battery x 2
	Test leads x 1

5. Battery Replacement



When the low battery symbol is displayed on the LCD, replace the old batteries with two new batteries.

5.1.Turn the power off and remove the test leads from the clamp meter.
5.2.Remove the screw of the battery compartment.
5.3.Lift and remove the battery compartment.
5.4.Remove the old batteries.
5.5.Insert two new 1.5V SUM-3 batteries.
5.6.Replace the battery compartment and secure the screw.

6. Maintenance & Cleaning

Servicing not covered in this manual should only be performed by qualified personnel. Repairs should only be performed by qualified personnel.

Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents.

Address of Agent, Distributor, Importer, or Manufacturer